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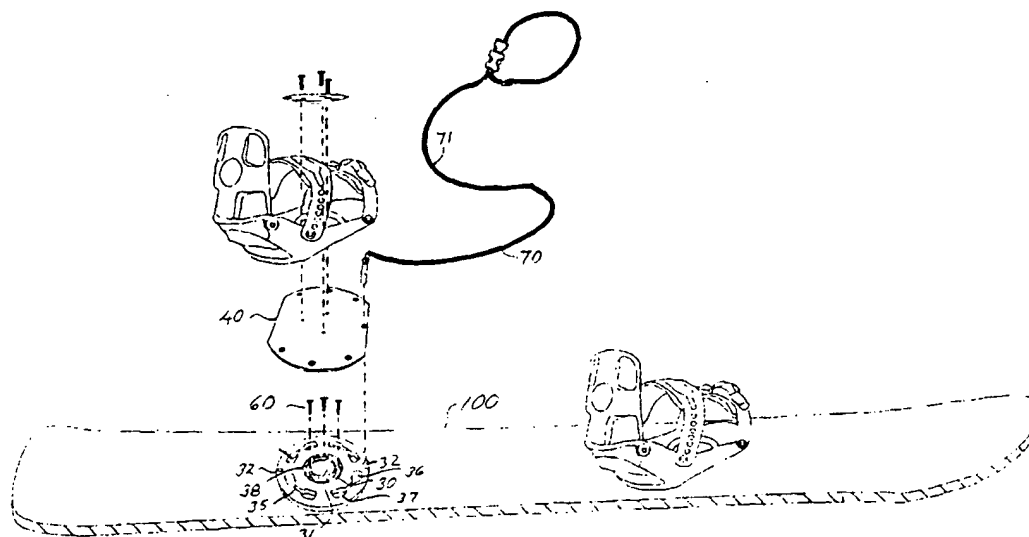


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: BOOT BINDING COUPLING FOR SNOW BOARDS



(57) Abstract

A coupling for releasably mounting a boot with boot binding plate (40) to a turntable ring (30) which is adjustably secured to a snowboard. The boot binding plate (40) includes a plurality of extending lock pins (41) each with a shoe (43) releasably locking into arcuate slots (35) in the turntable (30). The boot binding plate (40) is quickly directed to the coupling with a set of guide pins (45) protruding from the boot binding, which pins also serve as improved traction devices when the boot binding is disengaged from the turntable. Also extending from the boot binding plate is a latch pin (50) held under spring bias which when aligned in a hold position, fits into one of several latch pin holes (32) in the turntable. To release the plates from hold position, the latch pin (50) is pulled from the latch pin hole (32) by a flexible hand extension release device hand operated from a standing position and the plates are rotated to disengage the shoes from the arcuate slots.

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## BOOT BINDING COUPLING FOR SNOW BOARDS

## TECHNICAL FIELD

This invention relates to snow boards, and more specifically, to a coupling useful for releasably connecting a user boot binding to a snowboard, operated via a flexible hand extension release device.

## BACKGROUND ART

It has become well-known in recent years to use snowboards on ski slopes as another form of winter recreation similar to skiing. Snowboards are commercially available, for example, from Burton Snowboards of Manchester, Center, Vermont.

A snowboard rider uses a boot designed especially to the requirements of snowboarding. As with skiing, it is required to secure the boot to the snowboard with a binding. However, snowboarding differs from skiing in that both user boots attach to a single snowboard, and the user does not employ poles. Also unlike skiing, the boot bindings are mounted to the snowboard with screws into a pattern of screw holes, or possibly threaded inserts in the snowboard. This pattern of screw holes or inserts typically allows adjustment in stance relative to the longitudinal center line of the snowboard and stance width. The stance angle is varied with user preference and the style of snowboarding intended. Stance width is selected by the user on the basis of personal comfort and leg length. Typically, changing the

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stance angle means releasing the boot from its binding, loosening the mounting screws so that the binding may be rotated, and then retightening the screws. Changing stance width means removing the screws entirely and selecting another pattern of screw holes or inserts on the snowboard.

Before the present invention, it was not known in the art to have a readily available adjustment to the stance angle without removing the boot from the binding so that the user could change his orientation relative to the board.

When using commercial ski area chair lifts, a snowboarder user is required to disengage at least one boot from the binding to maneuver onto the chair because he is generally immobile with both legs attached to a single board, no poles, and no downward sloping terrain in his intended direction of travel. With one leg disengaged, he pushes himself forward with his free leg. This maneuvering with one leg attached to the snowboard and the other free is referred to as "skate boarding."

Having mounted the chair with only one boot attached to the board, the user is again challenged to dismount from the chair in full motion with a single boot engaged, usually down a slight incline. A roughened surface is usually provided on the snowboard for temporary control during dismounting; the user places the unbound boot on the roughened surface which then allows limited control.

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stops to rebind the boot to the boot binding. Thus, the snowboarder often finds himself stopped soon after dismounting from the ski lift chair to remount his free boot, often endangering himself and others, or he may have fallen for lack of adequate control.

Before this invention, a quick release of the boot binding from the snowboard from the user standing position was not known in the art, nor was it known to have a device on the bottom of the disengaged boot binding to improve traction. Generally, one boot had to be unstrapped from a board, an inconvenient and cumbersome task, at best. Then, with one boot disengaged, the user attempted to approach the ski chair lift. Although routine for traditional skiers, this normally simple task became a challenge without poles to assist, using only the disengaged boot pushing against the snow and ice with limited traction.

One solution to the rebinding problem is to attempt to rebind the boot while sitting on the chair. This is usually very difficult and perhaps dangerous. Another solution is to have a coupling for one boot binding easily released upon maneuvering toward the ski lift chair that quickly rejoins the boot and boot binding to the board. Kincheloe, U. S. Pat. No. 5,035,443, describes a binding designed to disengage easily. Briefly, the coupling comprises a channelled groove into which a plate slides to a securing position. In practice, it is found that the coupling does

not operate quickly enough to reengage upon dismount the lift chair during the dismount action. It is also that when ice gathers in the binding, the boot may not at all until ice is cleared. Thus, the problem remains have a binding that is not easily released but that and quickly reengages the boot onto the board, even in presence of ice and snow.

#### DISCLOSURE OF THE INVENTION

The present invention provides a snowboard coupling use between the snowboard and the user boot binding a quick release from the standing position. The coupling allows the user to reengage the boot binding to the board the user dismounts from the ski lift chair by standing the coupling followed by a short twisting motion that exploits the strength of the leg muscles.

The coupling includes a turntable ring with a central hole and a boot binding plate. The turntable ring is apart from the snowboard when mounted by a spacer plate. The turntable ring has a journal surface about its inner edge. A circular mounting plate having an annular raceway about its circumference that fits over the ring with the raceway overlapping on the journal surface, filling its center. The spacer plate may be separate and secured to the turntable ring or an integral part of the turntable. In mounting the turntable ring under the mounting plate on the snowboard, the mounting plate has a plurality of screws



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matching threaded holes, or inserts, in the snowboard. Thus, the turntable is secured to the snowboard, spaced therefrom by the spacer plate when mounting screws pass through these mounting plate holes and screw into the matching holes in the snowboard.

In the alternative, the mounting plate is dispensed with when the turntable ring has a plurality of arcuate screw slots on a concentric arc through which mounting screws pass, allowing rotation of the turntable through the arcuate dimension of the slots, similar to the rotation allowed with the mounting plate raceway sliding on the turntable ring journalled surface, both when the screws are not fully tightened.

When the turntable ring is rotated into a desired position, the mounting plate is secured tightly onto the board with the mounting screws through the matching screw holes.

The turntable ring further includes on a circular arc concentric with the circular plates a plurality of similar arcuate mounting slots. Each arcuate slot has a first large opening on one end. On the other end may be a second large opening. Also on the turntable ring is a plurality of latch pin holes.

In face-to-face contact with the turntable ring is a boot binding plate. On the boot binding plate is a plurality of slotted lock pins located and sized to match

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the large openings of the arcuate mounting slots of the turntable ring. Each lock pin has a waist separating a flange and a shoe. The flange is affixed to the boot binding plate. The shoe is sized to fit into a turntable arcuate slot large opening, and the waist is sized to slidably fit into the turntable ring arcuate slot, securing the shoe behind the arcuate slot in a hold position.

To easily locate the shoe into the arcuate large opening, a plurality of guide pins is provided on a circular arc on the boot binding plate outside of the lock pins and outside the radius of the turntable, extending slightly farther from the plate than do the lock pins. In use, the guide pins first orient the boot binding plate over the turntable ring. Slight movement then quickly locates the lock pin shoes into the turntable slots. The guide pins also serve as improved traction devices when the user is pushing with the disengaged boot binding to move toward a chair lift.

Also extending from the boot binding plate is a latch pin held under spring bias. The latch pin is sized and located to fit into one of the turntable latch pin holes when the lock pins are inserted into matching large openings of the arcuate mounting slots of the turntable ring in either end and rotated with their respective shoes behind the arcuate slot. When the latch pin is compressed under spring bias as the turntable and boot binding plates are

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urged together, it releases into the latch pin hole when the plates are rotated into hold position. With the plurality of latch pin holes, an adjustment or selection of angular orientation of the boot binding to the snowboard may be selected, even while snowboarding. Typically, 2 latch pin holes are angularly offset approximately 10 degrees. To release the plates from hold position, the latch pin is pulled from the latch pin hole by a flexible hand extension release device and the plates are rotated to engage/release position where the shoes are aligned with the turntable ring arcuate slot large openings. The release device extends from the latch pin where it is connected to the upper leg of the user within reach of the user without undue stooping where it is flexibly secured.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded projection pictorial view of the releasable bindings in the combination with a snowboard and boot.

FIG. 2 is a pictorial top view of a binding mounted on snowboard.

FIG. 3 is a cross-sectional view of the binding mounted on the snowboard.

FIG. 4 is a top schematic view of the binding mounted on the snowboard.

FIG. 5 is a top schematic view of the turntable ring with arcuate screw slots.

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FIG. 6 is a bottom view of the lock pin.

FIG. 7 is a side cross-sectional view of the lock pin.

FIG. 8 is a side cross-sectional view of the latch pin with spring bias.

FIG. 9 is a top schematic view of the turntable ring with inner journal surface.

FIG. 10 is an exploded view of the spacer plate, turntable ring and mounting plate.

FIG. 11a and 11b are side cross-sectional and top view of an adapter plate.

#### BEST MODE OF CARRYING OUT THE INVENTION

Referring to the figures, the present invention comprises a spacer plate 10, mounting plate 20, a circular turntable ring 30 with a concentric center hole 31, a plurality of latch pin holes 32, a boot binding plate 40, and a release latch pin unit 50.

The spacer plate 10 comprises a set of mounting holes 11 matching a pattern of threaded screw holes 101 in a snowboard 100 against which this plate is secured.

The mounting plate 20 comprises a set of mounting holes 21 matching those of the spacer plate 10. About the circumference of this spacer plate 20 is an annular raceway 21 formed by a circumferential flat 22 on the plate edge 23.

The turntable ring 30 comprises an inner annular journal surface 33 defining its inner center hole 31 sized to fit into the raceway of the mounting plate 20. With

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mounting plate 20 concentrically placed over the turntable ring 30 with its mounting holes 24 in alignment with the spacer plate mounting holes 11, the turntable ring 30 is secured to the snowboard 100 with its journal surface 33 overlapping with the mounting plate raceway 21 with screws 60 passing through the aligned mounting holes and into threaded holes in the snowboard 100. With the screws not tightened, the turntable ring 30 rotates freely on its journal surface 33 in the mounting plate raceway 21. When the screws are tightened, the turntable ring 30 is rotationally fixed and secured to the snowboard 100.

In an alternative embodiment, the turntable ring 30 comprises a plurality of arcuate screw slots 38 into which mounting screws pass with the screw head larger than and hence held by the slot. The slots 38 allow a measure of angular adjustment of the turntable ring 30 on the snowboard 100 when the screws are not securely tightened, thus alleviating the need for the mounting plate 20 with the raceway 21 and the turntable journal surface 33.

The turntable ring 30 further comprises a plurality of similar arcuate mounting slots 35 on a circular arc concentric with the circular plates 10 and 20. Each slot 35 has on one end a first large slot opening 36. On the arcuate slot end opposite the first large opening 36 may be a second large opening 37.

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The latch pin unit 50 comprises a right cylindrical shell housing 51 with a first concentric hole 52 in one end 53 and an open second opposite end 54 defining a cylindrical cavity 55 therein. The unit further comprises a latch pin 56 with a rod 57 extending out of the housing first concentric hole 52 and a head 58 on the rod inside, but extending out of, the housing 51 and slidably fit in the housing in the manner of a piston in a cylinder. Around the hatch pin rod 57 is a spring 59 extending within the cylinder cavity 55 maintaining the latch pin head 58 under a bias. In the rod end 60 extending out of the cylinder 51 is a keeper ring 61 larger than the cylinder first hole 52 to keep the rod from falling out of the cylinder under the spring bias within. A flexible hand extension release device 70 comprising a strap 71 with a buckle, Velcro attachment, or any other functionally similar device, on each end for attachment to the keeper ring 61 and to the user within easy reach of his arm.

In face-to-face contact with the turntable ring 30 is the boot finding plate 40 which further comprises a plurality of lock pins 41 extending from the plate and located opposite the mounting slots 35 of the turntable ring. Each lock pin 41 comprises a flange 42 secured to the boot binding plate 40 and a shoe 43 sized to fit into the turntable slot large openings 36 and 37. Between the flange 42 and the shoe 43 is a narrowing waist 44 sized to slidably

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fit into the turntable ring slot waist opening 44. The boot binding plate 40 is thereby secured to the turntable 30 in a hold position by inserting the shoe 43 of the respective lock pins into the turntable large opening 36 and 37. The boot binding plate 40 is secured to the turntable ring 30 by then rotating the boot binding plate 40 with the lock pin waist 44 moving into the arcuate slot 35.

The boot binding plate also comprises a plurality of guide pins 45 on a circular arc on the boot binding plate outside of the lock pins 41 and outside the radius of the turntable ring 30, extending slightly farther from the plate than do the lock pins. The guide pins 45 first orient the boot binding plate over the turntable ring generally. Slight movement then quickly locates the lock pin shoes 43 into the turntable slots 35.

The latch pin unit 50 is mounted to the boot binding plate 40 in matching location with the latch pin hole 32 of the turntable ring 30 such that when the relative position of the boot binding plate 40 to the turntable ring 30 is in set position, the latch pin head 58 aligns and sets into the latch pin hole 32. The boot binding plate 40 is released from the turntable ring 30 with the flexible hand release device 70 by pulling the keeper ring 61 on the latch pin unit 50, removing the latch pin rod 57 from the latch pin hole 32, then rotating the boot binding plate 40 until the

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lock pin shoe 43 moves away from the narrow arcuate slot 35 into alignment with the large slot opening 36 or 37.

An adapter plate 80 with snowboard mounting holes 81 in alignment with snowboard threaded holes 101 can be used in combination with the releasable snowboard boot binding coupling. The adapter plate 80 is mounted to the snowboard with screws (not shown) through the aligned holes. The adapter further comprises threaded holes 82 that match mounting plate holes 34 or turntable slots 38. In this combination, then, an adapter plate can be employed to accommodate any snowboard threaded hole pattern with a hole pattern of the releasable snowboard boot binding coupling.

#### INDUSTRIAL APPLICATION

The invention described herein has application to recreational and professional snow boarding.



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## CLAIMS

Having described the invention, what is claimed is

1. In combination with a snowboard having a plurality of threaded screw holes, a releasable snowboard boot binding coupling comprising

a circular turntable ring further comprising

a plurality of arcuate mounting slots on a circular arc with a first large slot opening on one end,

a boot binding plate comprising

a plurality of lock pins extending from the boot binding plate and located opposite the arcuate mounting slots of the turntable ring, each lock pin comprising

a flange secured to the turntable,

a shoe sized to fit into and through the turntable arcuate slot large opening,

a narrowing waist between the flange and the shoe sized such that upon partial rotation of the boot binding plate the lock pin slidably passes into the turntable ring arcuate slot,

a spacer plate secured to the turntable to separate the turntable from the snowboard,

latching means for releasably latching the turntable ring to the boot binding plate with the boot binding plate lock pin held in the turntable arcuate slot, and

means to adjustably secure the turntable with spacer plate to the snowboard.

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2. The invention of claim 1 wherein the means to adjustably secure the turntable with spacer plate to the snowboard comprises

a turntable with a center hole and having an inner annular journal surface on the turntable about the center hole,

a circular mounting plate having an annular raceway formed by a circumferential flat on the plate edge matching the journal surface of the turntable such that the mounting plate fills the turntable center hole with its annular raceway overlapping the turntable journal surface allowing the turntable to rotate under the mounting plate when loosely mounted,

means to tightly and removably secure the mounting plate to the snowboard.

3. The invention of claim 1 wherein the means to adjustably secure the turntable with spacer plate to the snowboard comprises

a turntable ring further comprising a second plurality of arcuate slots on a concentric arc, and

screws passing through the second arcuate slots into threaded holes in the snowboard, allowing the turntable angular rotation through its slot lengths when loosely mounted and affixing the turntable to the snowboard when securely tightened.

4. Deleted.

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5. The invention of claim 1 wherein the means for latching the turntable ring to the boot binding plate comprising

a circular turntable ring with a latch pin hole, and

a release latch pin unit with a latch pin under bias sized and located to releasably fit into the latch pin hole.

6. The invention of claim 5 wherein the release latch pin unit comprises

a right cylindrical shell housing with a first concentric hole in one end and an open second opposite end defining a cylindrical cavity therein,

a latch pin further comprising

a rod extending out of the housing first concentric hole, and

a head on the rod inside, but extending out of, the housing slidably fitting in the housing,

a spring extending within the cylinder cavity and around the latch pin rod maintaining the latch pin head under a bias,

a keeper ring in the rod end extending out of the cylinder and sized larger than the cylinder first hole,

7. The invention of claim 2 wherein the means to tightly and removably secure the mounting plate to the snowboard comprises

a spacer plate having a set of mounting holes matching the threaded holes of the snowboard,

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a plurality of screws passing through aligned mounting holes of the mounting plate and into the threaded holes in the snowboard with the mounting plate on the turntable ring with its raceway over the journal surface.

8. The releasable snowboard boot binding coupling in combination with a snowboard of claim 1 in further combination with an adapter plate between the snowboard and the first circular plate, means to secure the adapter plate to the snowboard, and means to secure the releasable snowboard boot binding to the adapter plate.

9. The invention of claim 8 wherein the means to removably secure the adapter plate to the snowboard comprises

an adapter plate with a plurality of mounting holes aligned with two or more snowboard threaded holes, and

a plurality of screws passing through aligned mounting holes of the adapter plate and into the threaded holes in the snowboard with the adapter plate set on the snowboard.

10. The invention of claim 1 further comprising

a plurality of guide pins on a circular arc on the boot binding plate outside of the lock pins and the turntable and extending from the boot binding plate a distance greater than the lock pins extend.

11. The invention of claim 1 further comprising a second large opening on the end of the arcuate slot opposite the first large opening.

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12. The invention of claim 2 further comprising means for releasing the latching means.
13. The invention of claim 12 wherein the means for releasing the latching means comprises a strap with a buckle on each end for attachment to the keeper ring and to the user within easy reach of the user's arm.
14. The combination of a flexible hand extension release device and a releasable snowboard boot binding coupling.
15. The invention of claim 14 further comprising in the flexible hand extension release a strap with a buckle on each end for attachment to the keeper ring and to the user within easy reach of the user's arm.
16. The invention of claim 1 or claim 14 further comprising a plurality of guide pins on a circular arc on the boot binding plate outside of the lock pins and the turntable, extending slightly further from the plate than do the lock pins.
17. The invention of claim 5 wherein the circular turntable ring further comprises a plurality of latch pin holes offset for adjustment of angular orientation of the boot binding plate on the turntable ring.
18. In combination with a snowboard having a plurality of threaded screw holes, a releasable snowboard boot binding coupling comprising
  - a circular turntable ring further comprising

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a plurality of arcuate mounting slots on a circular arc with a first large slot opening on one end,

a boot binding plate comprising

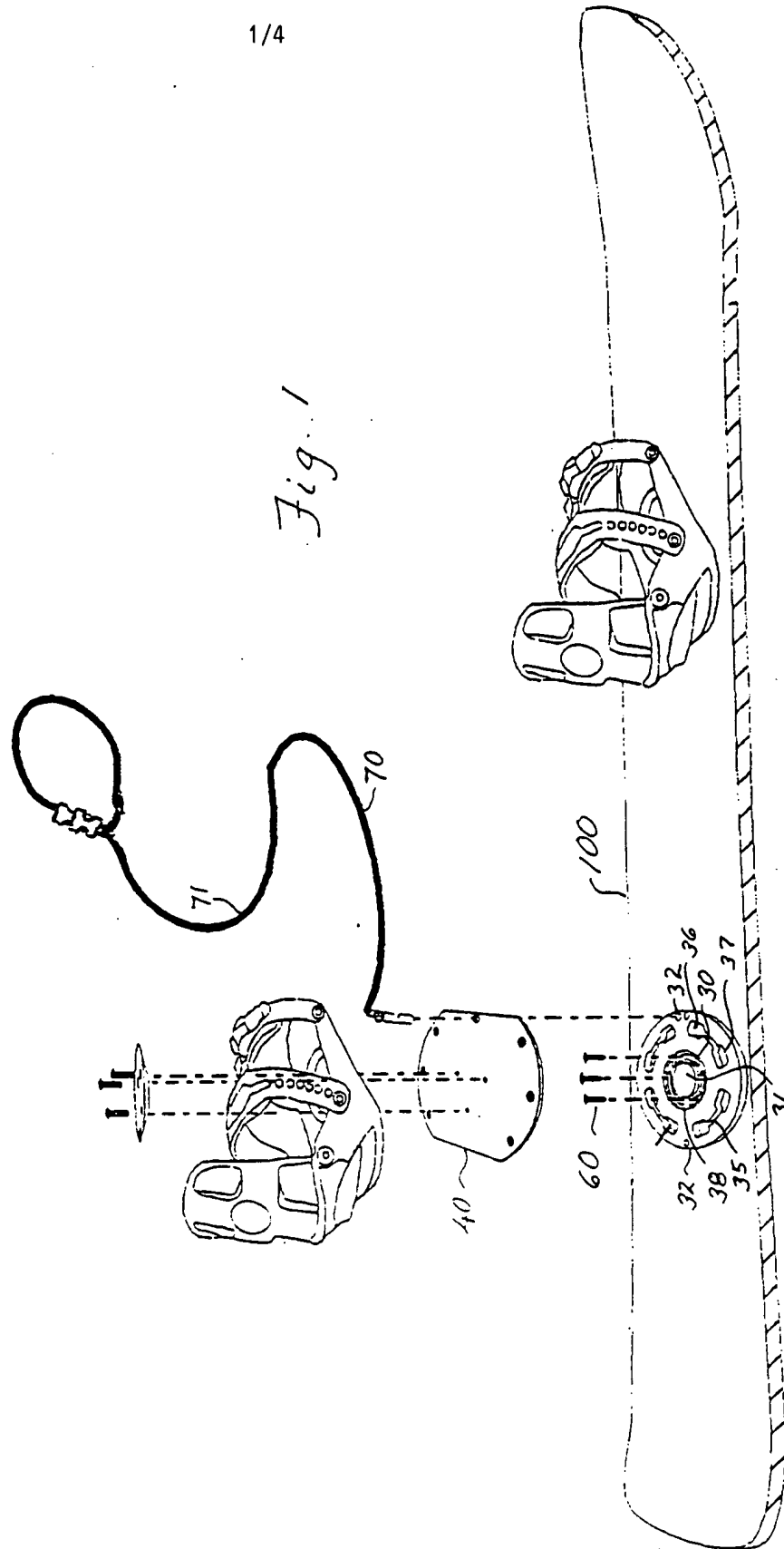
a plurality of lock pins extending from the boot binding plate and located opposite the arcuate mounting slots of the turntable ring

a spacer plate secured to the turntable to separate the turntable from the snowboard,

latching means for releasably latching the turntable ring to the boot binding plate with the boot binding plate lock pin held in the turntable arcuate slot, wherein the latch pin is attached to the boot binding plate and remains with the boot and boot binding plate when detached from the turntable ring, and

means to secure the turntable with spacer plate to the snowboard.

Fig. 1



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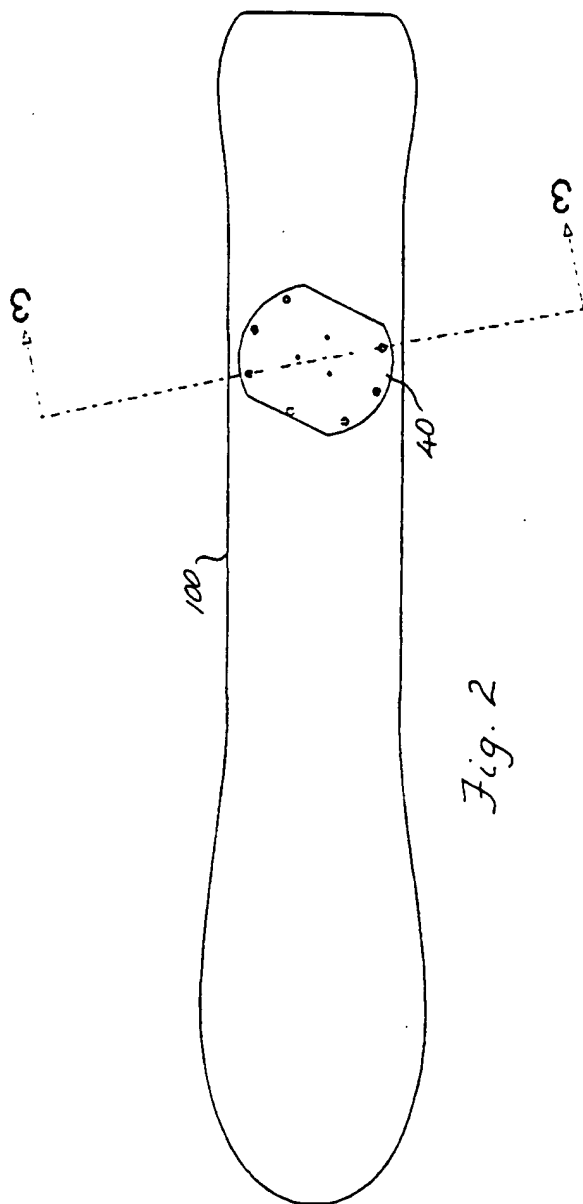


Fig. 2

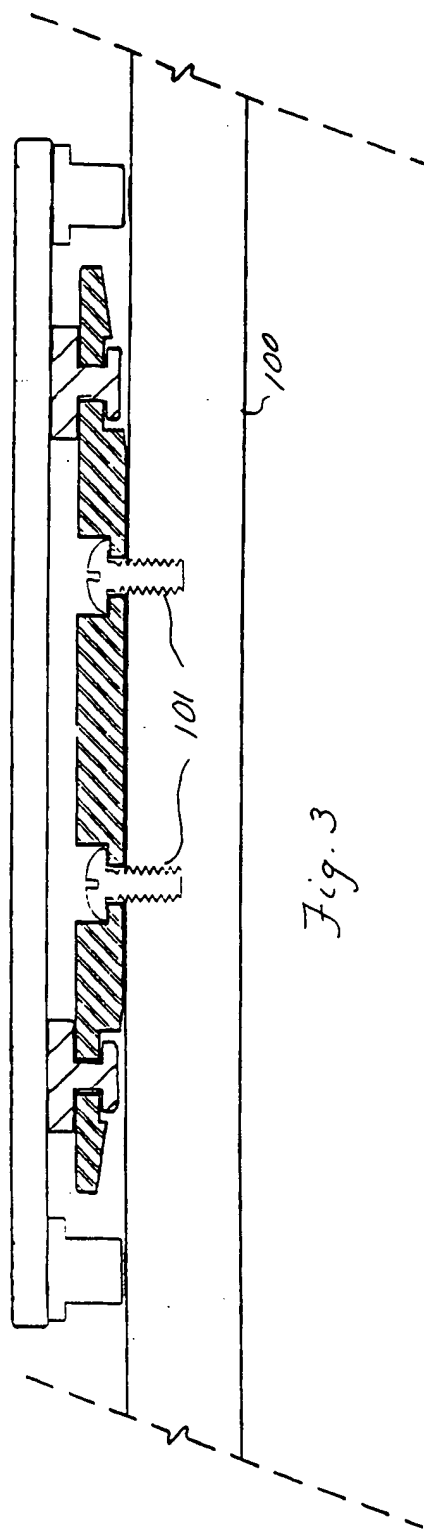


Fig. 3

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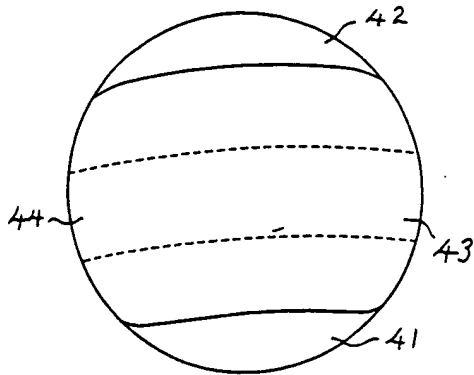


Fig. 6

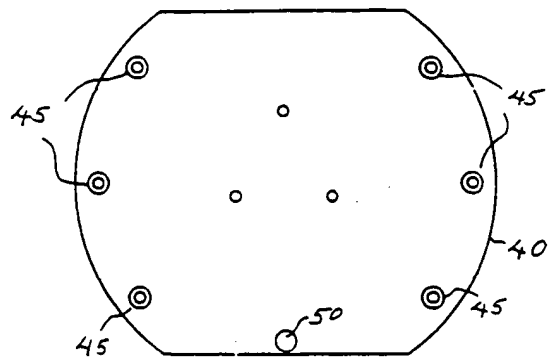


Fig. 4

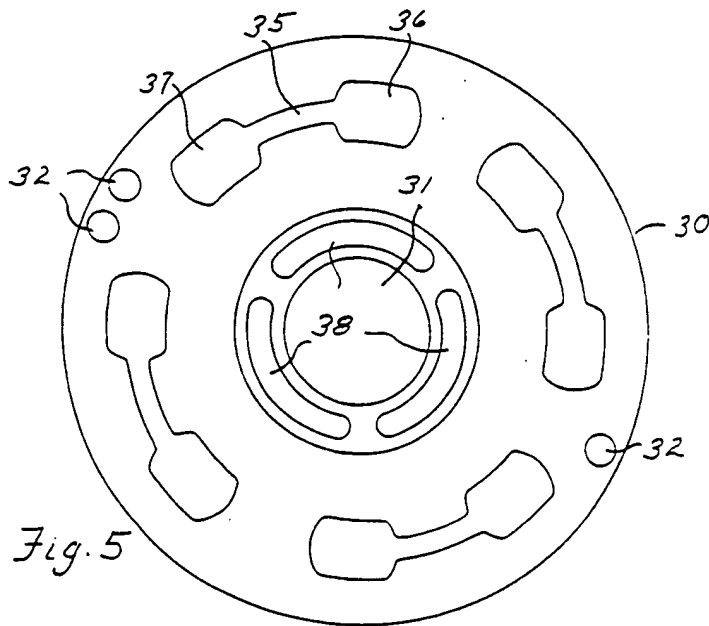


Fig. 5

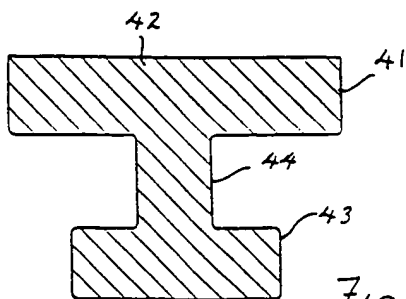


Fig. 7

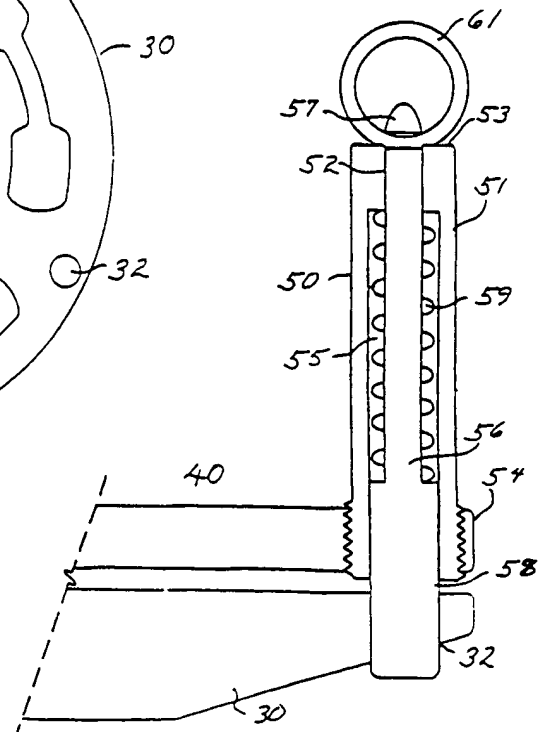
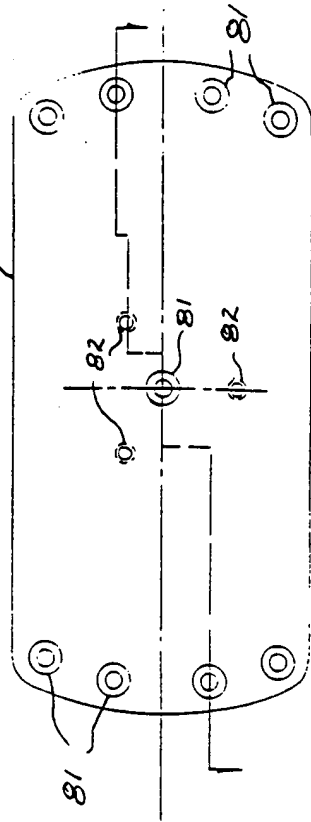
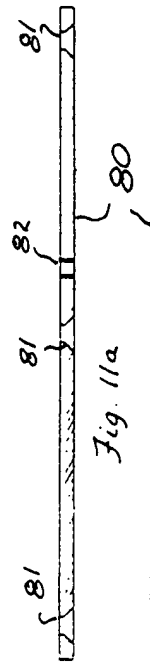
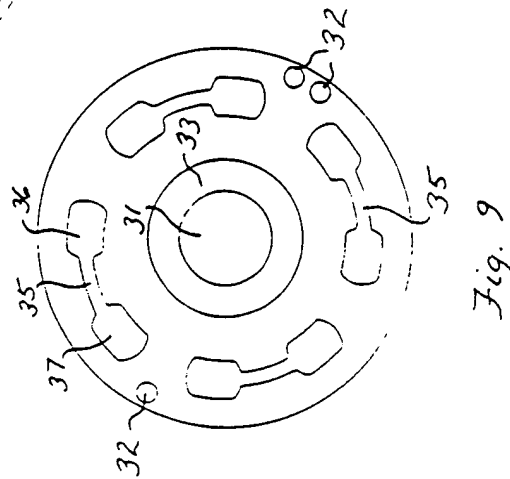
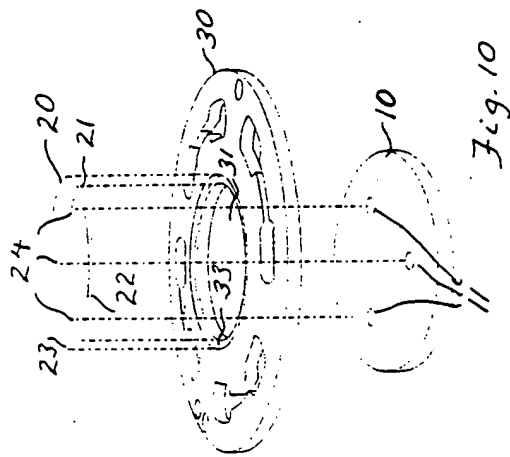


Fig. 8

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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US94/02810

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(5) :A63C 9/08

US CL :280/607, 618, 633, 14.2

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 280/601, 607, 617, 618, 633, 14.2

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
none

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
none

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|--|-----------------------|
| Y         | US, A 5,236,216 (Ratzek) 17 August 1993 See Fig. 1                                 | 1-3, 5, 7-18          |
| Y         | US, A 5,054,807 (Fauvet) 8 October 1991 See Fig. 6                                 | 1-3, 5, 7-18          |
| Y         | US, A 3,614,119 (Wilkes) 19 October 1971 See Fig. 1                                | 12-15                 |
| A         | US, A 4,871,337 (Harris) 03 October 1989<br>See entire document                    | none                  |
| A         | US, A 4,964,649 (Chamberlin) 23 October 1990<br>See entire document                | none                  |

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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Date of the actual completion of the international search  
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Name and mailing address of the ISA/US  
Commissioner of Patents and Trademarks  
Box PCT  
Washington, D.C. 20231

Authorized officer

Margaret A. Focarino

Facsimile No. (703) 305-3230

Telephone No. (703) 308-1113

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| <b>Category*</b> | <b>Citation of document, with indication, where appropriate, of the relevant passages</b> | <b>Relevant to claim No.</b> |
|------------------|---|------------------------------|
| <b>A</b>         | <b>US, A 5,190,311 (Carpenter et al) 02 March 1993</b><br><b>See Figs. 2 and 3</b>        | <b>none</b>                  |